DOCUMENT RESUME

ED 119 097 CG 010 406

AUTHOR Siegel, Jan; Powers, Richard B.
TITLE Development of Cooperation between Children in the Minimal Social Situation.
PUB DATE May 75
NOTE 17p.; Paper presented at the Annual Meeting of the Rocky Mountain Psychological Association (Salt Lake City, Utah, May 7-10, 1975); Charts in appendix may not reproduce clearly due to quality of original. Not available in hard copy

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS Behavioral Science Research; *Behavior Patterns; *Children; *Group Activities; *Interpersonal Competence; Research Projects; *Social Behavior; Social Environment

ABSTRACT

This paper investigated whether children can learn to cooperate under minimal social conditions. The research also compares the effectiveness of verbal instructions and a training task for teaching subjects the "win-stay/lose-change" rule. This rule has been used to explain the development of cooperation in the minimal social situation. Subjects were 19 teams of first-, second-, and third-graders. Five teams were composed of two girls; six were girl-boy teams; and eight were boy-boy teams. Ten of the 19 teams learned to cooperate in the minimal social situation without treatment. Two of four teams given the rule training procedure learned to cooperate after having failed to learn under typical social conditions. Of five teams given verbal instructions, four learned to cooperate immediately. The probability of following the rule "win-stay/lose-change" was approximately 50% initially and did not increase significantly in later sessions. Therefore, it is clear that closely following the "win-stay/lose-change" rule is not a prerequisite for the development of a stable cooperative exchange. Explanations in the literature which suggest subjects learn a single rule, i.e., "win-stay/lose-change," are probably misleading since children evidence a variety of rules, any of which might have been reinforced or punished over the course of the experiment. (Author)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED119097

DEVELOPMENT OF COOPERATION BETWEEN CHILDREN IN THE MINIMAL SOCIAL SITUATION

Jan Siegel and Richard B. Powers

Department of Psychology

Utah State University

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Paper presented at the annual meeting of the

Rocky Mountain Psychological Association

Salt Lake City, Utah
May, 1975

CE 010 406

BEST COPY AVAILABLE

HARD COPY NOT AVAILABLE

Study of the "minimal social situation" began with Sidowski, Wyckoff, and Tabory in 1956. The research was an attempt to explain social interaction entirely within an operant conditioning framework. Sidowski, et al. defined three essential features of a social situation:

> a) Two or more Ss have at their disposal responses which result in reinforcing or punishing effects on other Ss. b) The principal sources of reinforcement or punishment for any S depend on responses made by other Ss. c) The responses controlling reinforcement and punishment are subject to learning through trial and error. (1956, p. 115)

In keeping with this definition, Sidowski placed pairs of college students in isolated booths and told them to try to make points by pushing the buttons in front of them. The buttons of each partner controlled the reinforcement and punishment that the other partner received; however, subjects were not aware of the interdependency. Sidowski found that partners did learn to give each other positive reinforcement at a substantial rate.

The development of cooperation in the minimal social situation has been attributed to subjects' following a "win-stay, lose-change" rule. This rule suggests that when two subjects are responding in the minimal social situation, a subject receiving a reward will tend to repeat his previous response, i.e., he will push again the button he pushed last. A subject receiving punishment will change responses. If both members of the team follow this rule, they will lock into a mutually rewarding interchange within three trials.

All of the previous minimal social studies have used college students as subjects. Our research attempted to extend the findings with the minimal social research to children. Pilot research with six teams of second- and third-grade children indicated that they did not learn to cooperate in the minimal social situation in sessions ranging from 120 to

300 trials. Therefore, we devised a training procedure to teach children a win-stay, lose-change rule. Subjects with this history were compared to those who did not have the training and to those who were given a verbal summary of the rule.

METHOD

Subjects

Nineteen teams of first-, second-, and third-graders served as subjects. Subjects' ages ranged from 6 years 3 months to 10 years 2 months. In most cases subjects were paired with a partner of his own grade level. Five teams were composed of two girls; six were boy-girl teams; and eight were two-boy teams.

Typical Minimal Social Conditions

Under typical minimal social conditions, two subjects were placed in separate rooms in front of a panel (see Figure 1, top). The panel had a three-position switch, two counters--to register positive and negative points, a trial light, and two feedback lights--a red and a green to indicate positive and negative points. Each child was instructed to push the switch on his box either up or down when the white light on his panel lit. The response which each subject made was indicated on the experimenter's control box and when both children had responded, the experimenter delivered appropriate consequences to each child. If a child's partner had given him reinforcement, a green light flashed on his box and a point was added to his positive counter. If the partner had given punishment, a red light flashed and a point was added to his negative counter. A team was said to have reached criterion level performance when they played 14 consecutive mutually rewarding trials. The children could trade in their points at the end of a session for candy or small toys.

Rule Training Task

In the rule training task each child worked independently. He/she was seated in front of a large panel divided into two sections. Each section looked like the panel used in the minimal social situation (see Figure 1, bottom). When the small trial light was lit on the left side of the panel, the subject was to push the button on that side of his panel either up or down. The experimenter randomly gave the child either positive or negative points on that section of the panel. On the right section of the panel, the child was required to exhibit "win-stay, lose-change" behavior. If he had won on the previous part of the trial, he was required to make the same response on the right panel that he made on the left to win again; that is, if he pushed the response switch on the left panel up and won, he had to push the switch on the right panel up to win again. If he lost on the previous part of the trial, he had to change his response on the right side of the panel to win. A child was said to have reached criterion level performance when he performed 12 consecutive trials correctly.

The treatment was designed to teach the subject to use his previous response and the outcomes from it to discriminate what his next response should be.

Verbal Instructions

The task was the same in the verbal instruction condition as the typical minimal social situation, except that the subjects were verbally instructed on how to follow the "win-stay, lose-change" rule. The following instructions were read to each child:

> I'll tell you how you can really win a lot of points in this game. Everytime you win a point, push the button again the same way you did before. If you lose a point, push the button the other way.

The child was then asked to repeat the instruction. If he could not repeat the instruction or repeated it incorrectly, it was read to him again.

RESULTS

Groups Reaching Criterion without Treatment

The results of this study differed considerably from the preliminary research findings in which we found that none of six teams reached a stable exchange of rewards. Ten teams reached the criterion of 14 mutually rewarding trials without rule training or verbal instructions. Significantly more second and third grade teams learned to cooperate without treatment than did first grade teams ($p. < .05$). (Chi-square analysis)

There was a great deal of variability among these 10 teams on the number of trials required to reach criterion level performance (see Figure 2). One team played a plus-plus combination on the first trial and continued that pattern for 25 trials with neither partner switching responses. Another team played 344 trials before they began the run of mutually rewarding trials to criterion. Figure 2 shows the number of trials played by each team before they began the run of trials to criterion. The last column on the graph shows the median number of trials (128.5) to a criterion run for this group of subjects. Note that the team of ES and SC is at zero because they began the criterion run on the first trial.

Although it is difficult to choose a representative team, Figure 3 shows the data of a team (KM and YM) who reached criterion in approximately the median number of trials required by all the teams. The data plotted

is the number of mutually rewarding (or cooperative) trials per block of 10 trials across the pre-criterion run. Note that there is no gradual learning curve; in most cases a criterion run began fairly abruptly. Prior to a criterion run the curves for most teams show many sudden increases and decreases in the number of mutually rewarding trials.

Since learning in the minimal social situation has been attributed to subjects following a win-stay, lose-change rule, the probability that subjects followed that rule was computed and examined. For each team the percentage of rule adherence on the first 20 trials was compared to the last 20 trials before the criterion run. There was a slight, but not statistically significant, increase in rule adherence from the first 20 trials to the last. Rule adherence for teams increased from an average of 56.4 per cent to 60.4 per cent.

Several previous studies have reported that subjects showed an increase in win-stay behavior, but not in lose-change behavior (Kelley, Thibaut, Radloff, Mundy, 1962; Rabinowitz, Kelley, and Rosenblatt, 1966). Comparing the percentage of win-stay and lose-change responses per opportunity in the first 20 trials to the last 20 trials, the teams showed no significant increase in either win-stay or lose-change behavior. Win-stay behavior increased from a mean of 52.1 percent to a mean of 56.6 percent. Lose-change behavior increased from a mean of 63 percent to a mean of 65 percent.

Rule Training

Of 18 children given the rule training treatment, only one failed to reach criterion. The mean number of trials required prior to beginning a criterion run was 78.

Four teams of subjects were given rule training after having failed to reach criterion in at least 400 trials under typical minimal social conditions. When subjects were returned to the typical minimal social conditions, two teams showed rapid improvement and reached criterion almost immediately. Figure 4 shows the data for one of these teams. The broken line indicates the point at which rule training was given. The remaining two teams did not learn to cooperate until they were given verbal instructions.

Three other teams were given the training task prior to being placed in the minimal social situation. Two of these teams eventually learned to cooperate, one in 154 trials, the other in 161 trials. However, it is not certain whether this was due to the training procedure or whether they would have learned without any training. The third team required verbal instructions before learning to cooperate.

Verbal Instructions

Verbal instructions were given to one team after 110 trials in the typical minimal social situation and to another team after 400 trials. Both teams almost immediately locked into a mutually rewarding interchange. Figure 5 shows the data for one of these teams.

As was mentioned previously, two teams that had been given the rule training procedure failed to learn when returned to the minimal social situation. One of these teams began the criterion run on the first trial after being given verbal instructions. The other team did not learn to cooperate until verbal instructions were given a second time, 90 trials later. The data from this team is shown in Figure 6.

In analyzing the win-stay, lose-change behavior of the subjects who received treatment, the mean percentage of rule adherence on the first 20 trials was compared to the rule adherence on the last 20 trials before

treatment (either the training task or verbal instructions) was given. Rule adherence increased slightly from 58.8 per cent to 62.1 per cent, but this difference was not statistically significant.

Reversal Data

The response panels that the subjects used in our study were wired so that positive (i.e., the switch that gave positive points to the partner) was in the up position on one box and in the down position on the other. When teams had reached criterion once, the partners switched panels and the teams were again brought to criterion. Seventeen of the 19 teams learned to cooperate fairly readily in reversal. Again, there was considerable variability in the number of trials teams made before beginning the run of trials to criterion. Two teams began the criterion run on the first trial, while another team required 374 trials. The mean number of trials to criterion was 60; the median was 37. The two remaining teams required special treatment before learning to cooperate again. The training task was repeated with the members of one team; verbal instructions were repeated to the members of the other team.

Reliability

For 12 out of the 19 teams used in the study a reliability check was made on at least one entire session's data. Reliability was computed by dividing the number of agreements between two observers by the total of the agreements and disagreements. Reliability on both the training and the typical minimal social tasks ranged from 98 to 100 per cent.

DISCUSSION

From our research it appears that children can learn to cooperate in the minimal social situation. It is not clear why the results differed

from the pilot research, but it is possible that the children in the pilot research were not given enough trials. There was also one procedural change: in the pilot research there was no red light when the child lost a point as was the case in the present study. A number was registered on his minus counter when he lost a point, but this may not have been sufficiently clear feedback.

It is also unclear why there was not more generalization from the rule training task to the minimal social situation. It is possible that some children learned the rule, but that when placed in the minimal social situation their performance was punished. In the typical minimal social situation consequences are not consistent: a child may be punished by his partner for exhibiting win-stay or lose-change behavior or be reinforced for win-change or lose-stay behavior.

Looking at the data from subjects who learned to cooperate in the minimal social situation, the probability of adhering to the rule "win-stay, lose-change" was approximately 50 per cent initially and did not increase significantly in later sessions. It is not clear then that following the rule win-stay, lose-change is a prerequisite for the development of a stable cooperative exchange as had been suggested in earlier studies.

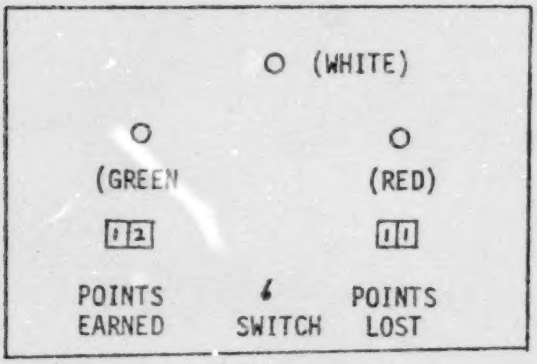
The children in our study exhibited many different response strategies throughout the sessions. Many children showed alternating behavior; others would play only one response for several hundred trials; still others would do some combination of responses such as two "up's" and one "down". These behaviors were probably intermittently reinforced by their partners. Explanations in the literature, which suggest subjects learn a single rule; i.e., win-stay, lose-change are probably misleading since children evidenced a variety of "rules" any of which might have been reinforced over the course of the experiment.

References

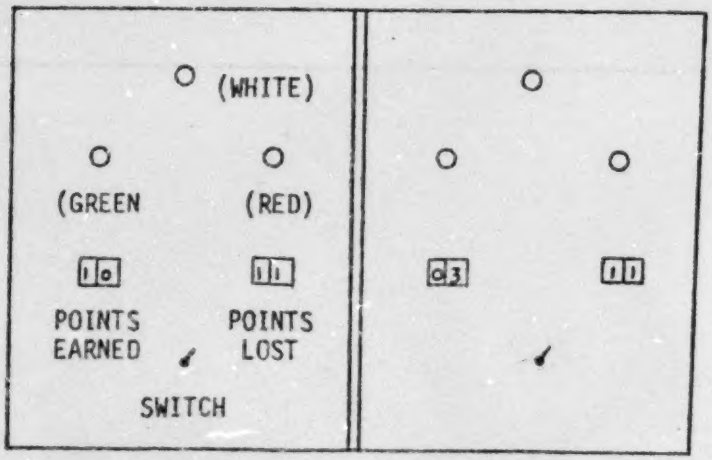
Kelley, H. H., Thibaut, J., Radloff, R., and Mundy, D. The development of cooperation in the "minimal social situation". Psychological Monographs, 1962, 76 (19, Whole No. 538).

Rabinowitz, L., Kelley, H. H., and Rosenblatt, R. Effects of different types of interdependence and response conditions in the minimal social situation. Journal of Experimental Social Psychology, 1966, 2, 169-197.

Sidowski, J., Wyckoff, L. B., and Tabory L. The influence of reinforcement and punishment in a minimal social situation. Journal of Abnormal and Social Psychology, 1956, 52, 115-119.

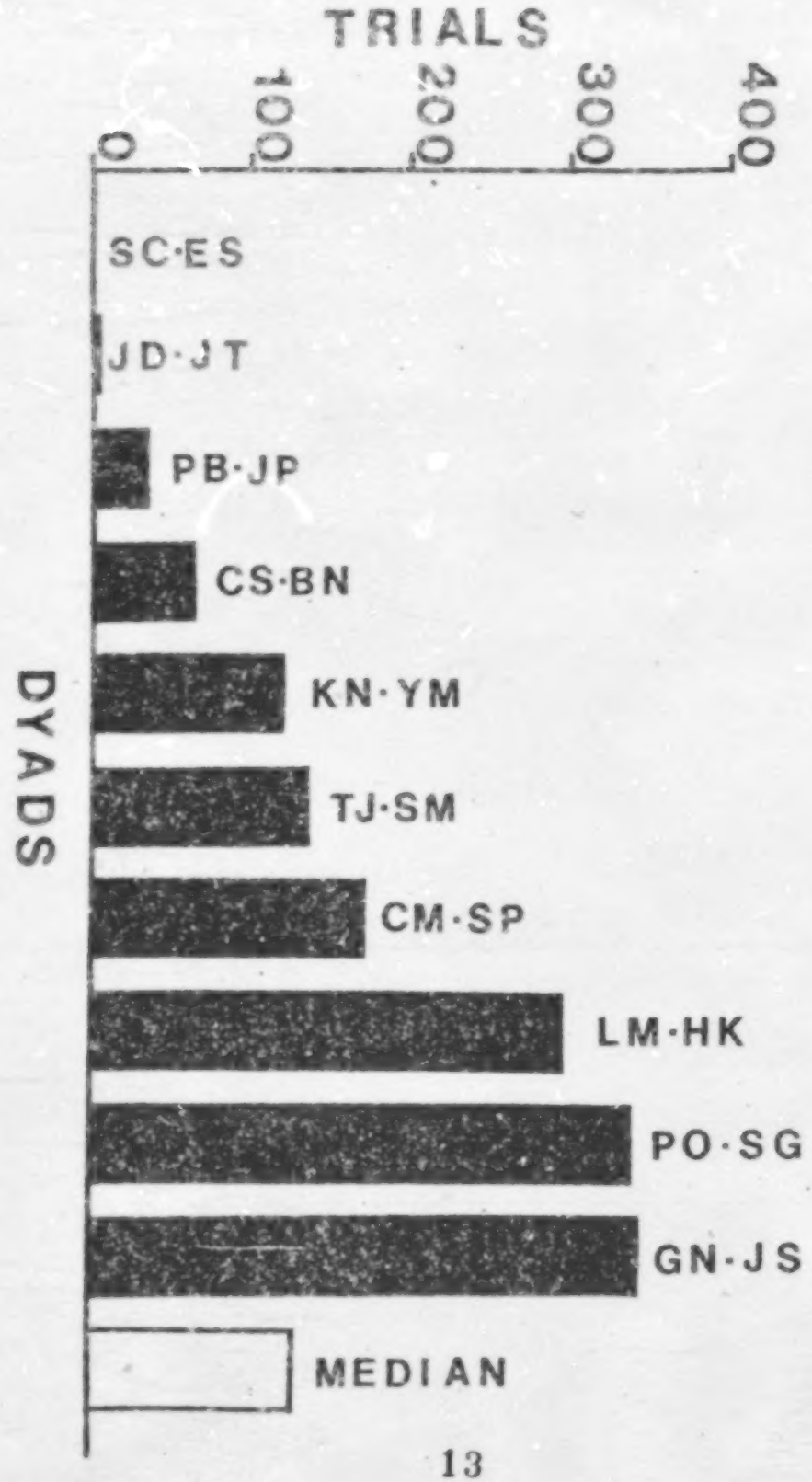


Response panel used by subjects under typical minimal social conditions.



Response panel used by subjects in the rule training task.

Figure 2


TRIALS
0
100
200
300
400
DYADS
SC·ES
JD·JT
PB·JP
CS·BN
KN·YM
TJ·SM
CM·SP
LM·HK
PO·SG
GN·JS
MEDIAN

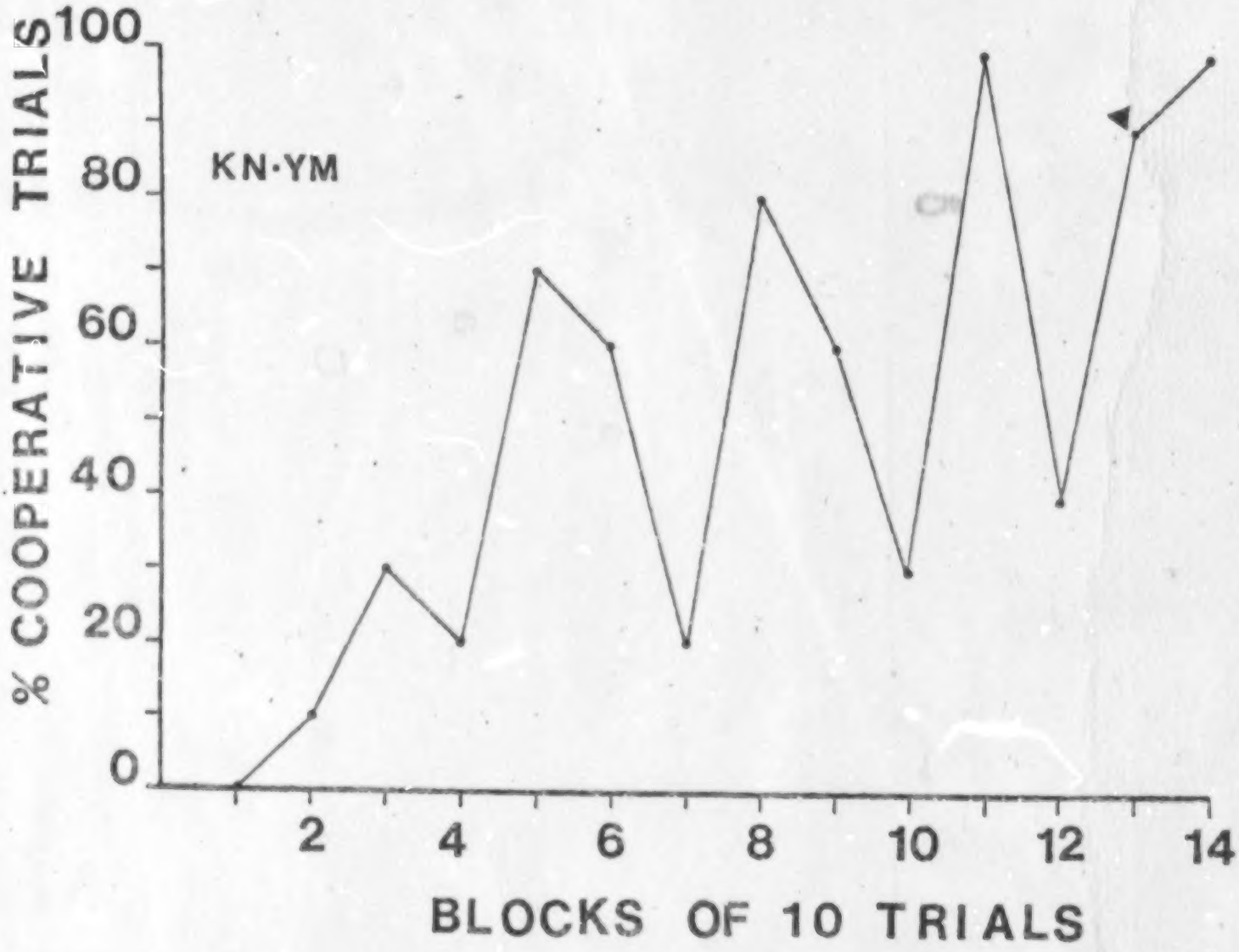

% COOPERATIVE TRIALS
100
80
60
40
20
0
KN·YM
2
4
6
8
10
12
14
BLOCKS OF 10 TRIALS

Figure 3.

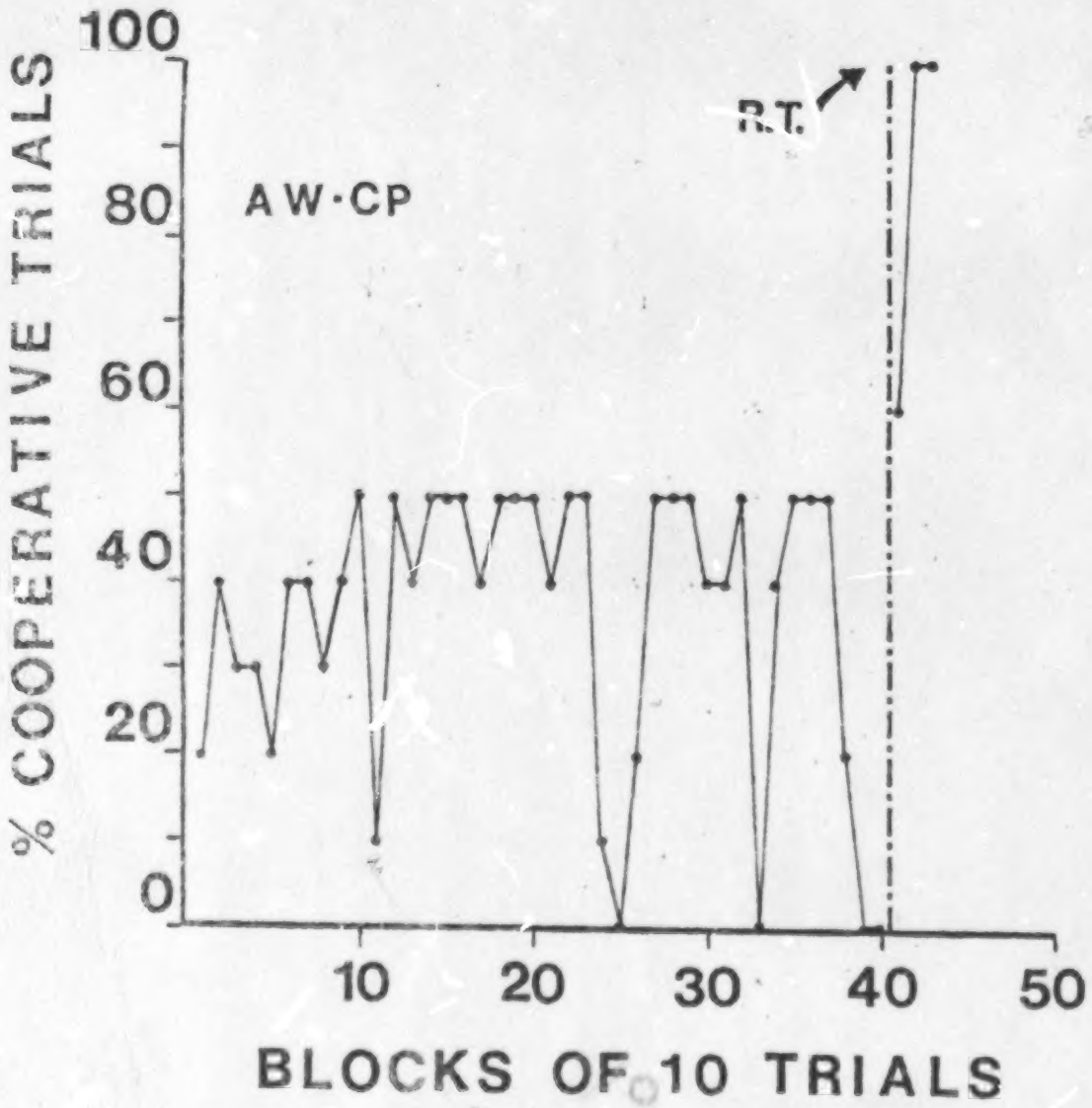

100
80
60
40
20
0
% COOPERATIVE TRIALS
AW·CP
R.T.
10
20
30
40
50
BLOCKS OF 10 TRIALS

Figure 4.

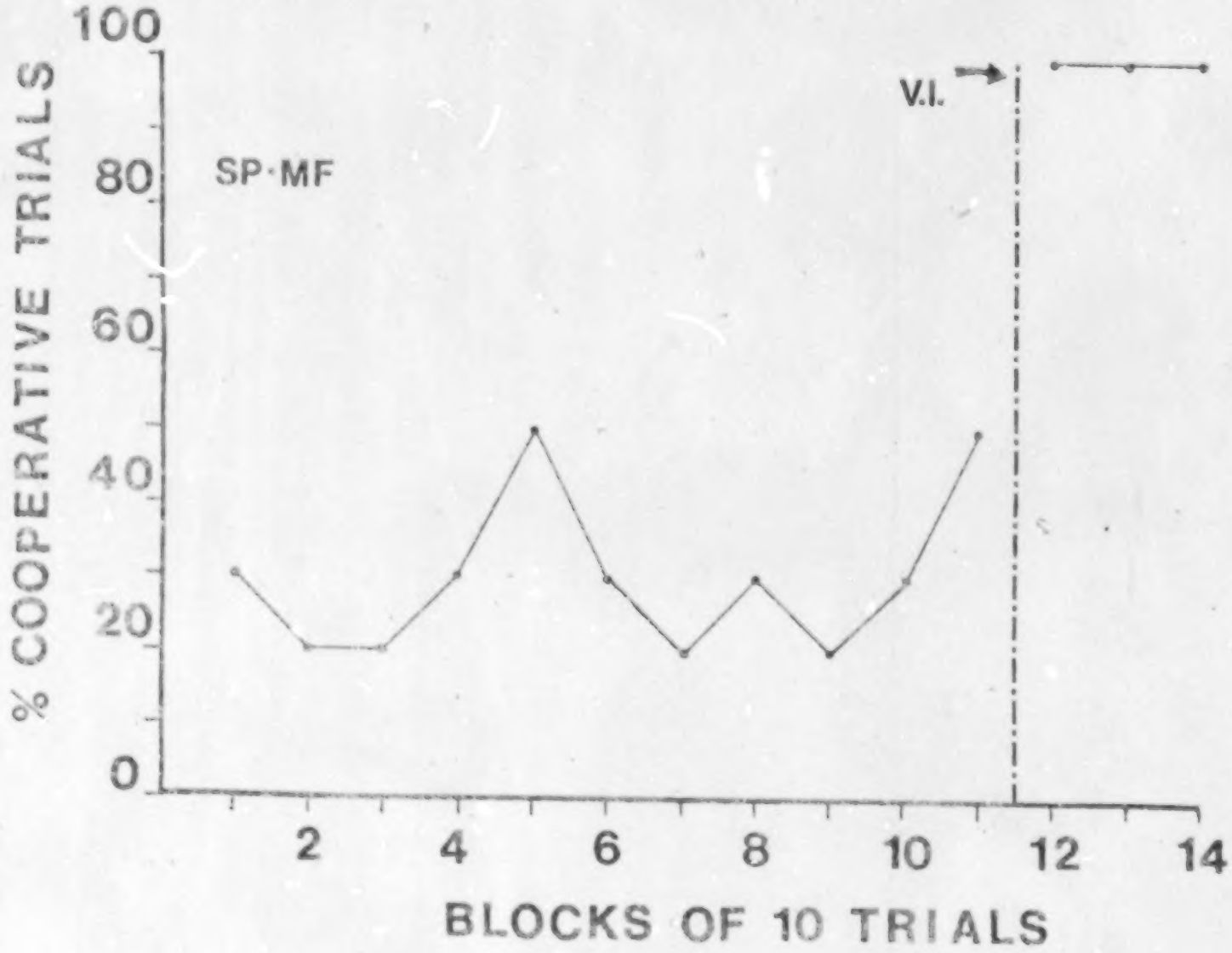

100
80
60
40
20
0
% COOPERATIVE TRIALS
SP·MF
V.I.
2
4
6
8
10
12
14
BLOCKS OF 10 TRIALS

Figure 5

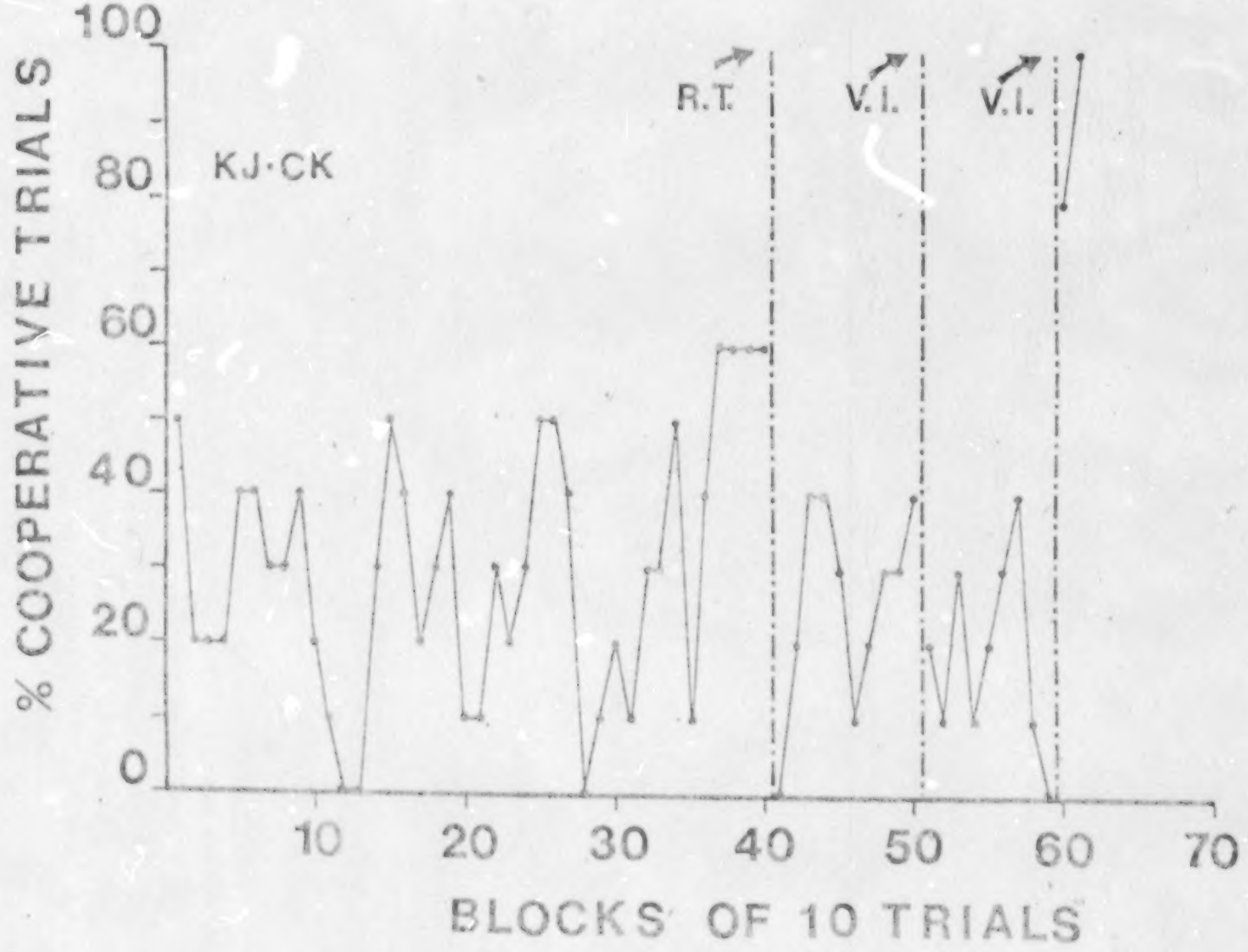

100
80
60
40
20
0
% COOPERATIVE TRIALS
KJ·CK
R.T.
V.I.
V.I.
10
20
30
40
50
60
70
BLOCKS OF 10 TRIALS

Figure 6